

WHAT IS CLAIMED IS:

1 1 An ink-jet printhead, comprising:
2 a substrate, having a rear surface, said rear surface having a predetermined
3 depth, wherein a plurality of ink feed holes are formed on a bottom of the channel perforating said
4 substrate;
5 a nozzle plate coupled to a front surface of the substrate, said nozzle plate being perforated
6 by a plurality of chamber-orifice complex holes, wherein each chamber-orifice complex hole
7 corresponds at least one of said plurality ink feed holes; and
8 a plurality of heaters disposed on the front surface of the substrate, each one of said plurality
9 of heaters being located near corresponding ones of said plurality of chamber-orifice complex holes.

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2 2. The ink-jet printhead of claim 1, wherein each one of said plurality of ink feed holes
3 is formed at a center portion of a corresponding one of said plurality of chamber-orifice complex
4 holes, and each one of said plurality of said heaters surrounds corresponding ones of said plurality
5 of ink feed holes.

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2 3. The ink-jet printhead of claim 2, wherein each one of said plurality of heaters is of
3 an omega shape that surrounds said corresponding ink feed hole.

1 4. The ink-jet printhead of claim 1, wherein each one of said plurality of heaters is

2 formed at a center portion of a region corresponding to one of said plurality of chamber-orifice
3 complex holes and said at least one ink feed hole is formed on one side of said heater.

1 5. The ink-jet printhead of claim 1, wherein each one of said plurality of heaters is
2 formed at a center portion of a region corresponding to one of said plurality of chamber-orifice
3 complex holes and ink feed holes are formed on both sides of said heater.

4 6. The ink-jet printhead of claim 2, wherein each chamber-orifice has a truncated conical
5 shape, wherein a lower end of said chamber orifice facing said substrate faces the corresponding ink
6 feed hole and heater formed on the substrate and the other end having a smaller diameter faces
7 toward an outside of said ink-jet printhead.

8 7. The ink-jet printhead of claim 5, wherein each chamber-orifice has a truncated conical
9 shape, wherein a lower end of said chamber orifice facing said substrate faces the corresponding ink
10 feed hole and heater formed on the substrate and the other end having a smaller diameter faces
11 toward an outside of said ink-jet printhead.

1 8. The ink-jet printhead of claim 7, wherein an expanded chamber having a
2 predetermined diameter is disposed at the lower portion of the chamber-orifice complex hole.

3 9. The ink-jet printhead of claim 2, wherein said substrate comprises two channels in

parallel with each other.

10. The ink-jet printhead of claim 7, wherein said substrate comprises two channels in parallel with each other

11. The ink-jet printhead of claim 2, wherein the channel has a V-shaped cross-section

12. The ink-jet printhead of claim 7, wherein the channel has a V-shaped cross-section.

13. The ink-jet printhead of claim 2, wherein the channel has a rectangular cross-section.

14. The ink-jet printhead of claim 7, wherein the channel has a rectangular cross-section.

15. An ink-jet printhead, comprising:

a substrate having a front side and a back side opposite to said front side, wherein said back side comprises a channel along an entire length of said substrate, said channel having a bottom wherein a plurality of holes perforate through to said front side of said substrate;

a plurality of heaters, each electrically connected to a pair of signal lines, disposed on said front side of said substrate, each one of said plurality of heaters being located near at least one of said plurality of holes in said substrate; and

a nozzle plate perforated by a plurality of nozzle holes, said nozzle plate being attached to

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11 said front side of said substrate so that each one of said plurality of nozzle holes exposes corresponding ones of said plurality of heaters and so that each one of said plurality of nozzle holes exposes at least one of said plurality of holes perforating said substrate.

1 16. The ink-jet printhead of claim 15, wherein each one of said plurality of heaters is
2 adjacent to two of said plurality of holes perforating said substrate, each pair of said plurality of
3 holes perforating said substrate and each one of said plurality of heaters being disposed at a bottom
4 of one of said plurality of holes perforating said nozzle plate.

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1 17. The ink-jet printhead of claim 15, wherein each one of said plurality of heaters is
2 adjacent to one of said plurality of holes perforating said substrate, each one of said plurality of holes
3 perforating said substrate and each one of said plurality of heaters being disposed at a bottom of one
4 of said plurality of holes perforating said nozzle plate.

1 18. The ink-jet printhead of claim 15, wherein each one of said plurality of heaters
2 essentially surrounds corresponding ones of said plurality of holes perforating said substrate, said
3 heater having an omega shape.

1 19. The ink-jet printhead of claim 15, said nozzle plate having a top side and a bottom side,
2 wherein each of said plurality of nozzle holes perforating said nozzle plate at said top side has a
3 relatively small diameter, and each of said plurality of nozzle holes at said bottom side having a

relatively large diameter, said bottom side of said nozzle plate being attached to said front side of said substrate, wherein an ink chamber is formed within each one of said plurality of nozzle holes perforating said nozzle plate.

20. The ink-jet printhead of claim 19, wherein each one of said plurality of nozzle holes perforating said nozzle plate is essentially conical in shape.

21. The ink-jet printhead of claim 18, said nozzle plate having a top side and a bottom side, wherein each of said plurality of nozzle holes perforating said nozzle plate at said top side has a relatively small diameter, and each of said plurality of nozzle holes at said bottom side having a relatively large diameter, said bottom side of said nozzle plate being attached to said front side of said substrate, wherein an ink chamber is formed within each one of said plurality of nozzle holes perforating said nozzle plate.

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22. The ink-jet printhead of claim 21, wherein each one of said plurality of nozzle holes perforating said nozzle plate is essentially conical in shape.

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23. A method for producing an ink-jet printhead, comprising the steps of:
etching a channel into a bottom side of a silicon substrate;
etching a plurality of holes on a bottom of said channel of said substrate to perforate said substrate;

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5 depositing a first plurality of signal lines and a second plurality of signal lines on a front side
6 of said silicon substrate, each one of said first plurality of signal lines terminating near termination
7 points of corresponding ones of said second plurality of signal lines, each of said terminating
8 portions of said first and said second signal lines terminating near at least one of said plurality of
9 holes perforating said substrate;

10 depositing a resistive material so as to connect terminating ends of each one of said first
11 plurality of signal lines with corresponding ones of said plurality of second plurality of signal lines,
12 said resistive material being near at least one of said plurality of holes perforating said substrate; and

13 attaching a nozzle plate perforated by a plurality of nozzle holes onto said front side of said
14 substrate so that each one of said plurality of nozzle holes is aligned to corresponding ones of
15 terminating ends of said first and said second signal lines, said resistive material, and at least one of
16 said plurality of holes perforating said substrate.

24. The method of claim 23, wherein said resistive material is essentially omega in shape
and surrounds corresponding ones of said plurality of holes perforating said substrate.

25. The method of claim 23, wherein said plurality of holes perforating said substrate occur
in pairs so that corresponding ones of said first and said second signal lines terminate in the vicinity
of a pair of holes perforating said substrate, wherein each one of said plurality of nozzle holes is
positioned over said pair of holes perforating said substrate.

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